



## SEQUENCE LISTING

<110> Bertin, John  
Wang, Weiye  
Blatcher, Maria

<120> NOVEL MOLECULES OF THE NBS/LRR PROTEIN FAMILY AND USES THEREOF

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<140> US 09/986,224  
2001-10-22

<150> US 09/848,035  
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Asn Trp Ile Arg Asn Ala Thr Val Asn Ile Leu Glu Glu Met Asn Leu  
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Thr Glu Leu Cys Lys Met Ala Lys Ala Glu Met Met Glu Asp Gly Gln  
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 His Gly Pro Ala Gly Val Gly Lys Thr Thr Leu Ala Lys Lys Cys Met  
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 Ser Leu Lys His Cys Gln Asp Leu Gln Lys Leu Ser Leu Gln Val Ala  
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                   35                                  40                                  45

Lys Glu Glu Leu Ala Asn Val Leu Pro Ile Ser Tyr Glu Gly Gln Tyr  
                   50                                  55                                  60

Ile Trp Asn Met Leu Phe Ser Ile Phe Ser Met Met Arg Lys Glu Asp  
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Leu Cys Arg Lys Ile Ile Gly Arg Arg Asn His Val Phe Tyr Ile Leu  
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gcc ccc atg gtg tgt tgg acc gta tgt tcc tgt ctg aag cag ccg aag Ala Pro Met Val Cys Trp Thr Val Cys Ser Cys Leu Lys Gln Pro Lys 245 250 255	768
gtg agg tat tac gat ctc cag tca atc act cag act acc acc agt ctg Val Arg Tyr Tyr Asp Leu Gln Ser Ile Thr Gln Thr Thr Thr Ser Leu 260 265 270	816
tat gcc tat ttt ttc tcc aac ttg ttc tcc aca gca gag gta gat ttg Tyr Ala Tyr Phe Phe Ser Asn Leu Phe Ser Thr Ala Glu Val Asp Leu 275 280 285	864
gca gat gac agc tgg cca gga caa tgg agg gcc ctc tgc agt ctg gcc Ala Asp Asp Ser Trp Pro Gly Gln Trp Arg Ala Leu Cys Ser Leu Ala 290 295 300	912
ata gaa ggg ctg tgg tct atg aac ttc acg ttt aac aaa gaa gac act Ile Glu Gly Leu Trp Ser Met Asn Phe Thr Phe Asn Lys Glu Asp Thr 305 310 315 320	960
gag atc gag ggc ctg gaa gtg cct ttc att gat tct ctc tac gag ttc Glu Ile Glu Gly Leu Glu Val Pro Phe Ile Asp Ser Leu Tyr Glu Phe 325 330 335	1008
aat att ctt caa aag atc aat gac tgt ggg ggt tgc act act ttc acc Asn Ile Leu Gln Lys Ile Asn Asp Cys Gly Gly Cys Thr Thr Phe Thr 340 345 350	1056
cac cta agt ttc cag gag ttt ttt gca gcc atg tcc ttt gtg cta gag His Leu Ser Phe Gln Glu Phe Phe Ala Ala Met Ser Phe Val Leu Glu 355 360 365	1104
gaa cct aga gaa ttc cct ccc cat tcc aca aag cca caa gag atg aag Glu Pro Arg Glu Phe Pro Pro His Ser Thr Lys Pro Gln Glu Met Lys 370 375 380	1152
atg tta ctg caa cac gtc ttg ctt gac aaa gaa gcc tac tgg act cca Met Leu Leu Gln His Val Leu Leu Asp Lys Glu Ala Tyr Trp Thr Pro 385 390 395 400	1200
gtg gtt ctg ttc ttc ttt ggt ctt tta aat aaa aac ata gca aga gaa Val Val Leu Phe Phe Phe Gly Leu Leu Asn Lys Asn Ile Ala Arg Glu 405 410 415	1248
ctg gaa gat act ttg cat tgt aaa ata tct ccc agg gta atg gag gaa Leu Glu Asp Thr Leu His Cys Lys Ile Ser Pro Arg Val Met Glu Glu 420 425 430	1296
tta tta aag tgg gga gaa gag tta ggt aag gct gaa agt gcc tct ctc Leu Leu Lys Trp Gly Glu Glu Leu Gly Lys Ala Glu Ser Ala Ser Leu 435 440 445	1344

caa ttt cac att cta cga ctt ttt cac tgc cta cac gag tcc cag gag	1392
Gln Phe His Ile Leu Arg Leu Phe His Cys Leu His Glu Ser Gln Glu	
450 455 460	
 gaa gac ttc aca aag aag atg ttg ggt cgt atc ttt gaa gtt gac ctt	1440
Glu Asp Phe Thr Lys Lys Met Leu Gly Arg Ile Phe Glu Val Asp Leu	
465 470 475 480	
 aat att ttg gag gac gaa gaa ctc caa gct tct tca ttt tgc cta aag	1488
Asn Ile Leu Glu Asp Glu Glu Leu Gln Ala Ser Ser Phe Cys Leu Lys	
485 490 495	
 cac tgt aaa agg tta aat aag cta agg ctt tct gtt agc agt cac atc	1536
His Cys Lys Arg Leu Asn Lys Leu Arg Leu Ser Val Ser Ser His Ile	
500 505 510	
 ctt gaa agg gac ttg gaa att ctg gag tga	1566
Leu Glu Arg Asp Leu Glu Ile Leu Glu	
515 520	

&lt;210&gt; 6

&lt;211&gt; 521

&lt;212&gt; PRT

&lt;213&gt; Homo sapiens

&lt;400&gt; 6

Met Lys Ala Glu Leu Leu Glu Thr Trp Asp Asn Ile Ser Trp Pro Lys	
1 5 10 15	
Asp His Val Tyr Ile Arg Asn Thr Ser Lys Asp Glu His Glu Leu	
20 25 30	
Gln Arg Leu Leu Asp Pro Asn Arg Thr Arg Ala Gln Ala Gln Thr Ile	
35 40 45	
Val Leu Val Gly Arg Ala Gly Val Gly Lys Thr Thr Leu Ala Met Gln	
50 55 60	
Ala Met Leu His Trp Ala Asn Gly Val Leu Phe Gln Gln Arg Phe Ser	
65 70 75 80	
Tyr Val Phe Tyr Leu Ser Cys His Lys Ile Arg Tyr Met Lys Glu Thr	
85 90 95	
Thr Phe Ala Glu Leu Ile Ser Leu Asp Trp Pro Asp Phe Asp Ala Pro	
100 105 110	
Ile Glu Glu Phe Met Ser Gln Pro Glu Lys Leu Leu Phe Ile Ile Asp	
115 120 125	
Gly Phe Glu Glu Ile Ile Ile Ser Glu Ser Arg Ser Glu Ser Leu Asp	
130 135 140	
Asp Gly Ser Pro Cys Thr Asp Trp Tyr Gln Glu Leu Pro Val Thr Lys	
145 150 155 160	
Ile Leu His Ser Leu Leu Lys Lys Glu Leu Val Pro Leu Ala Thr Leu	
165 170 175	
Leu Ile Thr Ile Lys Thr Trp Phe Val Arg Asp Leu Lys Ala Ser Leu	
180 185 190	
Val Asn Pro Cys Phe Val Gln Ile Thr Gly Phe Thr Gly Asp Asp Leu	
195 200 205	
Arg Val Tyr Phe Met Arg His Phe Asp Asp Ser Ser Glu Val Glu Lys	
210 215 220	
Ile Leu Gln Gln Leu Arg Lys Asn Glu Thr Leu Phe His Ser Cys Ser	
225 230 235 240	

Ala Pro Met Val Cys Trp Thr Val Cys Ser Cys Leu Lys Gln Pro Lys  
 245 250 255  
 Val Arg Tyr Tyr Asp Leu Gln Ser Ile Thr Gln Thr Thr Thr Ser Leu  
 260 265 270  
 Tyr Ala Tyr Phe Phe Ser Asn Leu Phe Ser Thr Ala Glu Val Asp Leu  
 275 280 285  
 Ala Asp Asp Ser Trp Pro Gly Gln Trp Arg Ala Leu Cys Ser Leu Ala  
 290 295 300  
 Ile Glu Gly Leu Trp Ser Met Asn Phe Thr Phe Asn Lys Glu Asp Thr  
 305 310 315 320  
 Glu Ile Glu Gly Leu Glu Val Pro Phe Ile Asp Ser Leu Tyr Glu Phe  
 325 330 335  
 Asn Ile Leu Gln Lys Ile Asn Asp Cys Gly Gly Cys Thr Thr Phe Thr  
 340 345 350  
 His Leu Ser Phe Gln Glu Phe Phe Ala Ala Met Ser Phe Val Leu Glu  
 355 360 365  
 Glu Pro Arg Glu Phe Pro Pro His Ser Thr Lys Pro Gln Glu Met Lys  
 370 375 380  
 Met Leu Leu Gln His Val Leu Leu Asp Lys Glu Ala Tyr Trp Thr Pro  
 385 390 395 400  
 Val Val Leu Phe Phe Phe Gly Leu Leu Asn Lys Asn Ile Ala Arg Glu  
 405 410 415  
 Leu Glu Asp Thr Leu His Cys Lys Ile Ser Pro Arg Val Met Glu Glu  
 420 425 430  
 Leu Leu Lys Trp Gly Glu Glu Leu Gly Lys Ala Glu Ser Ala Ser Leu  
 435 440 445  
 Gln Phe His Ile Leu Arg Leu Phe His Cys Leu His Glu Ser Gln Glu  
 450 455 460  
 Glu Asp Phe Thr Lys Lys Met Leu Gly Arg Ile Phe Glu Val Asp Leu  
 465 470 475 480  
 Asn Ile Leu Glu Asp Glu Glu Leu Gln Ala Ser Ser Phe Cys Leu Lys  
 485 490 495  
 His Cys Lys Arg Leu Asn Lys Leu Arg Leu Ser Val Ser Ser His Ile  
 500 505 510  
 Leu Glu Arg Asp Leu Glu Ile Leu Glu  
 515 520

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 <212> DNA  
 <213> Homo sapiens

<220>  
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 Ser Arg Leu Trp Ser Ser Lys Ser Val Thr Glu Ile His Leu Tyr Phe  
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 gag gag gaa gtc aag caa gaa gaa tgt gac cat ttg gac cgc ctt ttt 97  
 Glu Glu Glu Val Lys Gln Glu Glu Cys Asp His Leu Asp Arg Leu Phe  
 20 25 30

gct ccc aag gaa gct ggg aaa cag cca cgt aca gtg atc att caa gga Ala Pro Lys Glu Ala Gly Lys Gln Pro Arg Thr Val Ile Ile Gln Gly 35 40 45	145
cca caa gga att gga aaa acg aca ctc ctg atg aag ctg atg atg gcc Pro Gln Gly Ile Gly Lys Thr Thr Leu Leu Met Lys Leu Met Met Ala 50 55 60	193
tgg tgc gac aac aag atc ttt cgg gat agg ttc ctg tac acg ttc tat Trp Ser Asp Asn Lys Ile Phe Arg Asp Arg Phe Leu Tyr Thr Phe Tyr 65 70 75 80	241
ttc tgc tgc aga gaa ctg agg gag ttg ccg cca acg agt ttg gct gac Phe Cys Cys Arg Glu Leu Arg Glu Leu Pro Pro Thr Ser Leu Ala Asp 85 90 95	289
ttg att tcc aga gag tgg cct gac ccc gct gct cct ata aca gag atc Leu Ile Ser Arg Glu Trp Pro Asp Pro Ala Ala Pro Ile Thr Glu Ile 100 105 110	337
gtg tct caa ccg gag aga ctc ttg ttc gtc atc gac agc ttc gaa gag Val Ser Gln Pro Glu Arg Leu Leu Phe Val Ile Asp Ser Phe Glu Glu 115 120 125	385
ctg cag ggc ggc ttg aac gaa ccc gat tgc gat ctg tgt ggt gac ttg Leu Gln Gly Gly Leu Asn Glu Pro Asp Ser Asp Leu Cys Gly Asp Leu 130 135 140	433
atg gag aaa ccg ccg gtg cag gtg ctt ctg agc agt ttg ctg agg aag Met Glu Lys Arg Pro Val Gln Val Leu Leu Ser Ser Leu Leu Arg Lys 145 150 155 160	481
aag atg ctc ccg gag gcc tcc ctg ctc atc gct atc aaa ccc gtg tgc Lys Met Leu Pro Glu Ala Ser Leu Leu Ile Ala Ile Lys Pro Val Cys 165 170 175	529
ccg aag gag ctc ccg gat cag gtg acg atc tca gaa atc tac cag ccc Pro Lys Glu Leu Arg Asp Gln Val Thr Ile Ser Glu Ile Tyr Gln Pro 180 185 190	577
ccg gga ttc aac gag agt gat agg tta gtg tat ttc tgc tgt ttc ttc Arg Gly Phe Asn Glu Ser Asp Arg Leu Val Tyr Phe Cys Cys Phe Phe 195 200 205	625
aaa gac ccg aaa aga gcc atg gaa gcc ttc aat ctt gta aga gaa agt Lys Asp Pro Lys Arg Ala Met Glu Ala Phe Asn Leu Val Arg Glu Ser 210 215 220	673
gaa cag ctg ttt tcc ata tgc caa atc ccg ctc ctc tgc tgg atc ctg Glu Gln Leu Phe Ser Ile Cys Gln Ile Pro Leu Leu Cys Trp Ile Leu 225 230 235 240	721
tgt acc agt ctg aag caa gag atg cag aaa gga aaa gac ctg gcc ctg Cys Thr Ser Leu Lys Gln Glu Met Gln Lys Gly Lys Asp Leu Ala Leu 245 250 255	769



acc tgc cag agc act acc tct gtg tac tcc tct ttc gtc ttt aac ctg	817
Thr Cys Gln Ser Thr Thr Ser Val Tyr Ser Ser Phe Val Phe Asn Leu	
260 265 270	
ttc aca cct gag ggt gcc gag ggc ccg act ccg caa acc cag cac cag	865
Phe Thr Pro Glu Gly Ala Glu Gly Pro Thr Pro Gln Thr Gln His Gln	
275 280 285	
ctg aag gcc ctg tgc tcc ctg gct gca gag ggt atg tgg aca gac aca	913
Leu Lys Ala Leu Cys Ser Leu Ala Ala Glu Gly Met Trp Thr Asp Thr	
290 295 300	
ttt gag ttt tgt gaa gac gac ctc ccg aga aat ggg gtt gtt gac gct	961
Phe Glu Phe Cys Glu Asp Asp Leu Arg Arg Asn Gly Val Val Asp Ala	
305 310 315 320	
gac atc cct gcg ctg ctg ggc acc aag ata ctt ctg aag tac ggg gag	1009
Asp Ile Pro Ala Leu Leu Gly Thr Lys Ile Leu Leu Lys Tyr Gly Glu	
325 330 335	
cgt gag agc tcc tac gtg ttc ctc cac gtg tgt atc cag gag ttc tgt	1057
Arg Glu Ser Ser Tyr Val Phe Leu His Val Cys Ile Gln Glu Phe Cys	
340 345 350	
gcc gcc ttg ttc tat ttg ctc aag agc cac ctt gat cat cct cac cca	1105
Ala Ala Leu Phe Tyr Leu Leu Lys Ser His Leu Asp His Pro His Pro	
355 360 365	
gct gtg aga tgt gta cag gaa ttg cta gtt gcc aat ttt gaa aaa gca	1153
Ala Val Arg Cys Val Gln Glu Leu Leu Val Ala Asn Phe Glu Lys Ala	
370 375 380	
agg aga gca cat tgg att ttt ttg ggg tgt ttt cta act ggc ctt tta	1201
Arg Arg Ala His Trp Ile Phe Leu Gly Cys Phe Leu Thr Gly Leu Leu	
385 390 395 400	
aat aaa aag gaa caa gaa aaa ctg gat gcg ttt ttt ggc ttc caa ctg	1249
Asn Lys Lys Glu Gln Glu Lys Leu Asp Ala Phe Phe Gly Phe Gln Leu	
405 410 415	
tcc caa gag ata aag cag caa att cac cag tgc ctg aag agc tta ggg	1297
Ser Gln Glu Ile Lys Gln Gln Ile His Gln Cys Leu Lys Ser Leu Gly	
420 425 430	
gag cgt ggc aat cct cag gga cag gtg gat tcc ttg gcg ata ttt tac	1345
Glu Arg Gly Asn Pro Gln Gly Gln Val Asp Ser Leu Ala Ile Phe Tyr	
435 440 445	
tgt ctc ttt gaa atg cag gat cct gcc ttt gtg aag cag gca gtg aac	1393
Cys Leu Phe Glu Met Gln Asp Pro Ala Phe Val Lys Gln Ala Val Asn	
450 455 460	
ctc ctc caa gaa gct aac ttt cat att att gac aac gtg gac ttg gtg	1441
Leu Leu Gln Glu Ala Asn Phe His Ile Ile Asp Asn Val Asp Leu Val	
465 470 475 480	

gtt tct gcc tac tgc tta aaa tac tgc tcc agc ttg agg aaa ctc tgt	1489
Val Ser Ala Tyr Cys Leu Lys Tyr Cys Ser Ser Leu Arg Lys Leu Cys	
485 490 495	
ttt tcc gtt caa aat gtc ttt aag aaa gag gat gaa cac agc tct acg	1537
Phe Ser Val Gln Asn Val Phe Lys Lys Glu Asp Glu His Ser Ser Thr	
500 505 510	
tcg gat tac agc ctc atc tgt tgg cat cac atc tgc tct gtg ctc acc	1585
Ser Asp Tyr Ser Leu Ile Cys Trp His His Ile Cys Ser Val Leu Thr	
515 520 525	
acc agc ggg cac ctc aga gag ctc cag gtg cag gac agc acc ctc agc	1633
Thr Ser Gly His Leu Arg Glu Leu Gln Val Gln Asp Ser Thr Leu Ser	
530 535 540	
gag tcg acc ttt gtg acc tgg tgt aac cag ctg agg cat ccc agc tgt	1681
Glu Ser Thr Phe Val Thr Trp Cys Asn Gln Leu Arg His Pro Ser Cys	
545 550 555 560	
cgc ctt cag aag ctt gga ata aat aac gtt tcc ttt tct ggc cag agt	1729
Arg Leu Gln Lys Leu Gly Ile Asn Asn Val Ser Phe Ser Gly Gln Ser	
565 570 575	
gtt ctg ctc ttt gag gtg ctc ttt tat cag cca gac ttg aaa tac ctg	1777
Val Leu Leu Phe Glu Val Leu Phe Tyr Gln Pro Asp Leu Lys Tyr Leu	
580 585 590	
agc ttc acc ctc acg aaa ctc tct cgt gat gac atc agg tcc ctc tgt	1825
Ser Phe Thr Leu Thr Lys Leu Ser Arg Asp Asp Ile Arg Ser Leu Cys	
595 600 605	
gat gcc ttg aac tac cca gca ggc aac gtc aaa gag cta gcg ctg gta	1873
Asp Ala Leu Asn Tyr Pro Ala Gly Asn Val Lys Glu Leu Ala Leu Val	
610 615 620	
aat tgt cac ctc tca ccc att gat tgt gaa gtc ctt gct ggc ctt cta	1921
Asn Cys His Leu Ser Pro Ile Asp Cys Glu Val Leu Ala Gly Leu Leu	
625 630 635 640	
acc aac aac aag aag ctg acg tat ctg aat gta tcc tgc aac cag tta	1969
Thr Asn Asn Lys Lys Leu Thr Tyr Leu Asn Val Ser Cys Asn Gln Leu	
645 650 655	
gac aca ggc gtg ccc ctt ttg tgt gaa gcc ctg tgc agc cca gac agc	2017
Asp Thr Gly Val Pro Leu Leu Cys Glu Ala Leu Cys Ser Pro Asp Thr	
660 665 670	
gtc ctg gta tac ctg atg ttg gct ttc tgc cac ctc agc gag cag tgc	2065
Val Leu Val Tyr Leu Met Leu Ala Phe Cys His Leu Ser Glu Gln Cys	
675 680 685	
tgc gaa tac atc tct gaa atg ctt ctg cgt aac aag agc gtg cgc tat	2113
Cys Glu Tyr Ile Ser Glu Met Leu Leu Arg Asn Lys Ser Val Arg Tyr	
690 695 700	

cta gac ctc agt gcc aat gtc ctg aag gac gaa gga ctg aaa act ctc Leu Asp Leu Ser Ala Asn Val Leu Lys Asp Glu Gly Leu Lys Thr Leu 705 710 715 720	2161
tgc gag gcc ttg aaa cat ccg gac tgc tgc ctg gat tca ctg tgt ttg Cys Glu Ala Leu Lys His Pro Asp Cys Cys Leu Asp Ser Leu Cys Leu 725 730 735	2209
gta aaa tgt ttt atc act gct gct ggc tgt gaa gac ctc gcc tct gct Val Lys Cys Phe Ile Thr Ala Ala Gly Cys Glu Asp Leu Ala Ser Ala 740 745 750	2257
ctc atc agc aat caa aac ctg aag att ctg caa att ggg tgc aat gaa Leu Ile Ser Asn Gln Asn Leu Lys Ile Leu Gln Ile Gly Cys Asn Glu 755 760 765	2305
atc gga gat gtg ggt gtg cag ctg ttg tgt cgg gct ctg acg cat acg Ile Gly Asp Val Gly Val Gln Leu Leu Cys Arg Ala Leu Thr His Thr 770 775 780	2353
gat tgc cgc tta gag att ctt ggg ttg gaa gaa tgt ggg tta acg agc Asp Cys Arg Leu Glu Ile Leu Gly Leu Glu Gly Cys Gly Leu Thr Ser 785 790 795 800	2401
acc tgc tgt aag gat ctc gcg tct gtt ctc acc tgc agt aag acc ctg Thr Cys Cys Lys Asp Leu Ala Ser Val Leu Thr Cys Ser Lys Thr Leu 805 810 815	2449
cag cag ctc aac ctg acc ttg aac acc ttg gac cac aca ggg gtg gtt Gln Gln Leu Asn Leu Thr Leu Asn Thr Leu Asp His Thr Gly Val Val 820 825 830	2497
gta ctc tgt gag gcc ctg aga cac cca gag tgt gcc ctg cag gtg ctc Val Leu Cys Glu Ala Leu Arg His Pro Glu Cys Ala Leu Gln Val Leu 835 840 845	2545
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<213> Homo sapiens	
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Ala Pro Lys Glu Ala Gly Lys Gln Pro Arg Thr Val Ile Ile Gln Gly 35 40 45	
Pro Gln Gly Ile Gly Lys Thr Thr Leu Leu Met Lys Leu Met Met Ala 50 55 60	
Trp Ser Asp Asn Lys Ile Phe Arg Asp Arg Phe Leu Tyr Thr Phe Tyr 65 70 75 80	

Phe Cys Cys Arg Glu Leu Arg Glu Leu Pro Thr Ser Leu Ala Asp  
 85 90 95  
 Leu Ile Ser Arg Glu Trp Pro Asp Pro Ala Ala Pro Ile Thr Glu Ile  
 100 105 110  
 Val Ser Gln Pro Glu Arg Leu Leu Phe Val Ile Asp Ser Phe Glu Glu  
 115 120 125  
 Leu Gln Gly Gly Leu Asn Glu Pro Asp Ser Asp Leu Cys Gly Asp Leu  
 130 135 140  
 Met Glu Lys Arg Pro Val Gln Val Leu Leu Ser Ser Leu Leu Arg Lys  
 145 150 155 160  
 Lys Met Leu Pro Glu Ala Ser Leu Leu Ile Ala Ile Lys Pro Val Cys  
 165 170 175  
 Pro Lys Glu Leu Arg Asp Gln Val Thr Ile Ser Glu Ile Tyr Gln Pro  
 180 185 190  
 Arg Gly Phe Asn Glu Ser Asp Arg Leu Val Tyr Phe Cys Cys Phe Phe  
 195 200 205  
 Lys Asp Pro Lys Arg Ala Met Glu Ala Phe Asn Leu Val Arg Glu Ser  
 210 215 220  
 Glu Gln Leu Phe Ser Ile Cys Gln Ile Pro Leu Leu Cys Trp Ile Leu  
 225 230 235 240  
 Cys Thr Ser Leu Lys Gln Glu Met Gln Lys Gly Lys Asp Leu Ala Leu  
 245 250 255  
 Thr Cys Gln Ser Thr Thr Ser Val Tyr Ser Ser Phe Val Phe Asn Leu  
 260 265 270  
 Phe Thr Pro Glu Gly Ala Glu Gly Pro Thr Pro Gln Thr Gln His Gln  
 275 280 285  
 Leu Lys Ala Leu Cys Ser Leu Ala Ala Glu Gly Met Trp Thr Asp Thr  
 290 295 300  
 Phe Glu Phe Cys Glu Asp Asp Leu Arg Arg Asn Gly Val Val Asp Ala  
 305 310 315 320  
 Asp Ile Pro Ala Leu Leu Gly Thr Lys Ile Leu Leu Lys Tyr Gly Glu  
 325 330 335  
 Arg Glu Ser Ser Tyr Val Phe Leu His Val Cys Ile Gln Glu Phe Cys  
 340 345 350  
 Ala Ala Leu Phe Tyr Leu Leu Lys Ser His Leu Asp His Pro His Pro  
 355 360 365  
 Ala Val Arg Cys Val Gln Glu Leu Leu Val Ala Asn Phe Glu Lys Ala  
 370 375 380  
 Arg Arg Ala His Trp Ile Phe Leu Gly Cys Phe Leu Thr Gly Leu Leu  
 385 390 395 400  
 Asn Lys Lys Glu Gln Glu Lys Leu Asp Ala Phe Phe Gly Phe Gln Leu  
 405 410 415  
 Ser Gln Glu Ile Lys Gln Gln Ile His Gln Cys Leu Lys Ser Leu Gly  
 420 425 430  
 Glu Arg Gly Asn Pro Gln Gly Gln Val Asp Ser Leu Ala Ile Phe Tyr  
 435 440 445  
 Cys Leu Phe Glu Met Gln Asp Pro Ala Phe Val Lys Gln Ala Val Asn  
 450 455 460  
 Leu Leu Gln Glu Ala Asn Phe His Ile Ile Asp Asn Val Asp Leu Val  
 465 470 475 480  
 Val Ser Ala Tyr Cys Leu Lys Tyr Cys Ser Ser Leu Arg Lys Leu Cys  
 485 490 495  
 Phe Ser Val Gln Asn Val Phe Lys Lys Glu Asp Glu His Ser Ser Thr  
 500 505 510  
 Ser Asp Tyr Ser Leu Ile Cys Trp His His Ile Cys Ser Val Leu Thr  
 515 520 525

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Thr Ser Gly His Leu Arg Glu Leu Gln Val Gln Asp Ser Thr Leu Ser
530          535          540
Glu Ser Thr Phe Val Thr Trp Cys Asn Gln Leu Arg His Pro Ser Cys
545          550          555          560
Arg Leu Gln Lys Leu Gly Ile Asn Asn Val Ser Phe Ser Gly Gln Ser
565          570          575
Val Leu Leu Phe Glu Val Leu Phe Tyr Gln Pro Asp Leu Lys Tyr Leu
580          585          590
Ser Phe Thr Leu Thr Lys Leu Ser Arg Asp Asp Ile Arg Ser Leu Cys
595          600          605
Asp Ala Leu Asn Tyr Pro Ala Gly Asn Val Lys Glu Leu Ala Leu Val
610          615          620
Asn Cys His Leu Ser Pro Ile Asp Cys Glu Val Leu Ala Gly Leu Leu
625          630          635          640
Thr Asn Asn Lys Lys Leu Thr Tyr Leu Asn Val Ser Cys Asn Gln Leu
645          650          655
Asp Thr Gly Val Pro Leu Leu Cys Glu Ala Leu Cys Ser Pro Asp Thr
660          665          670
Val Leu Val Tyr Leu Met Leu Ala Phe Cys His Leu Ser Glu Gln Cys
675          680          685
Cys Glu Tyr Ile Ser Glu Met Leu Leu Arg Asn Lys Ser Val Arg Tyr
690          695          700
Leu Asp Leu Ser Ala Asn Val Leu Lys Asp Glu Gly Leu Lys Thr Leu
705          710          715          720
Cys Glu Ala Leu Lys His Pro Asp Cys Cys Leu Asp Ser Leu Cys Leu
725          730          735
Val Lys Cys Phe Ile Thr Ala Ala Gly Cys Glu Asp Leu Ala Ser Ala
740          745          750
Leu Ile Ser Asn Gln Asn Leu Lys Ile Leu Gln Ile Gly Cys Asn Glu
755          760          765
Ile Gly Asp Val Gly Val Gln Leu Leu Cys Arg Ala Leu Thr His Thr
770          775          780
Asp Cys Arg Leu Glu Ile Leu Gly Leu Glu Glu Cys Gly Leu Thr Ser
785          790          795          800
Thr Cys Cys Lys Asp Leu Ala Ser Val Leu Thr Cys Ser Lys Thr Leu
805          810          815
Gln Gln Leu Asn Leu Thr Leu Asn Thr Leu Asp His Thr Gly Val Val
820          825          830
Val Leu Cys Glu Ala Leu Arg His Pro Glu Cys Ala Leu Gln Val Leu
835          840          845
Gly Val Val Ala Gly Val Arg Thr Lys Gln
850          855

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<210> 9
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<212> PRT
<213> Homo sapiens

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<212> PRT
<213> Homo sapiens

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<210> 11  
 <211> 28  
 <212> PRT  
 <213> Homo sapiens

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 1 5 10 15  
 Tyr Asn Asp Glu Ser Gln Glu Val Gln Arg His Phe  
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<220>  
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 Met Thr Ser Pro Gln Leu Glu Trp Thr Leu Gln Thr Leu Leu Glu Gln  
 1 5 10 15  
 ctg aac gag gat gaa tta aag agt ttc aaa tcc ctt tta tgg gct ttt 154  
 Leu Asn Glu Asp Glu Leu Lys Ser Phe Lys Ser Leu Leu Trp Ala Phe  
 20 25 30  
 ccc ctc gaa gac gtg cta cag aag acc cca tgg tct gag gtg gaa gag 202  
 Pro Leu Glu Asp Val Leu Gln Lys Thr Pro Trp Ser Glu Val Glu Glu  
 35 40 45  
 gct gat ggc aag aaa ctg gca gaa att ctg gtc aac acc tcc tca gaa 250  
 Ala Asp Gly Lys Lys Leu Ala Glu Ile Leu Val Asn Thr Ser Ser Glu  
 50 55 60  
 aat tgg ata agg aat gcg act gtg aac atc ttg gaa gag atg aat ctc 298  
 Asn Trp Ile Arg Asn Ala Thr Val Asn Ile Leu Glu Glu Met Asn Leu  
 65 70 75 80  
 acg gaa ttg tgt aag atg gca aag gct gag atg atg gag gac gga cag 346  
 Thr Glu Leu Cys Lys Met Ala Lys Ala Glu Met Met Glu Asp Gly Gln  
 85 90 95  
 gtg caa gaa ata gat aat cct gag ctg gga gat gca gaa gaa gac tcg 394  
 Val Gln Glu Ile Asp Asn Pro Glu Leu Gly Asp Ala Glu Glu Asp Ser  
 100 105 110

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 His Gly Pro Ala Gly Val Gly Lys Thr Thr Leu Ala Lys Lys Cys Met  
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 Val Cys Thr Thr Leu Lys Leu Gln Met Glu Lys Gly Glu Asp Pro Val  
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 Pro Thr Cys Leu Thr Arg Thr Gly Leu Phe Leu Arg Phe Leu Cys Ser  
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Asp	Ile	Lys	Gln	Glu	Leu	Leu	Gln	Cys	Lys	Ala	His	Leu	His	Ala	Asn		
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His	Leu	Gln	Lys	Val	Glu	Ile	Lys	Asn	Val	Thr	Pro	Asp	Thr	Ala	Tyr		
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Met Ala Glu Ser Asp Ser Thr Asp Phe Asp Leu Leu Trp Tyr Leu Glu
1 5 10 15

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aat ctg agt gac aag gaa ttt cag agt ttt aag aag tat ctg gca cgc 96
Asn Leu Ser Asp Lys Glu Phe Gln Ser Phe Lys Lys Tyr Leu Ala Arg
20 25 30

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aag att ctt gat ttc aaa ctg cca cag ttt cca ctg ata cag atg aca 144
Lys Ile Leu Asp Phe Lys Leu Pro Gln Phe Pro Leu Ile Gln Met Thr
35 40 45

```

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aaa gaa gaa ctg gct aac gtg ttg cca atc tct tat gag gga cag tat 192
Lys Glu Glu Leu Ala Asn Val Leu Pro Ile Ser Tyr Glu Gly Gln Tyr
50 55 60

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ata tgg aat atg ctg ttc agc ata ttt tca atg atg cgt aag gaa gat 240
Ile Trp Asn Met Leu Phe Ser Ile Phe Ser Met Met Arg Lys Glu Asp
65 70 75 80

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Leu Cys Arg Lys Ile Ile Gly Arg Arg Asn His Val Phe Tyr Ile Leu
85 90 95

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100 105 110

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gag gac ttg gac aac ata aga ttc gag tta aat gtc aat gaa agt gct Glu Asp Leu Asp Asn Ile Arg Phe Glu Leu Asn Val Asn Glu Ser Ala 195 200 205	624
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 785 790 795 800  
  
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 805 810 815  
  
 gcc tct gtt ctt acc acc aac aaa aca cta gaa aga ctc aac ttg ctt 2496  
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 caa aat cac ttg ggc aat gat gga gtt gca aaa ctt ctt gag agc ttg 2544  
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 835 840 845  
  
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 865 870 875

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<211> 875

<212> PRT

<213> Homo sapiens

<400> 16

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 Lys Ile Leu Asp Phe Lys Leu Pro Gln Phe Pro Leu Ile Gln Met Thr  
 35 40 45  
 Lys Glu Glu Leu Ala Asn Val Leu Pro Ile Ser Tyr Glu Gly Gln Tyr  
 50 55 60  
 Ile Trp Asn Met Leu Phe Ser Ile Phe Ser Met Met Arg Lys Glu Asp  
 65 70 75 80  
 Leu Cys Arg Lys Ile Ile Gly Arg Arg Asn His Val Phe Tyr Ile Leu  
 85 90 95  
 Gln Leu Ala Tyr Asp Ser Thr Ser Tyr Tyr Ser Ala Asn Asn Leu Asn  
 100 105 110  
 Val Phe Leu Met Gly Glu Arg Ala Ser Gly Lys Thr Ile Val Ile Asn  
 115 120 125  
 Leu Ala Val Leu Arg Trp Ile Lys Gly Glu Met Trp Gln Asn Met Ile  
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 Ser Tyr Val Val His Leu Thr Ser His Glu Ile Asn Gln Met Thr Asn  
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 Ser Ser Leu Ala Glu Leu Ile Ala Lys Asp Trp Pro Asp Gly Gln Ala  
 165 170 175  
 Pro Ile Ala Asp Ile Leu Ser Asp Pro Lys Lys Leu Leu Phe Ile Leu  
 180 185 190  
 Glu Asp Leu Asp Asn Ile Arg Phe Glu Leu Asn Val Asn Glu Ser Ala  
 195 200 205

Leu Cys Ser Asn Ser Thr Gln Lys Val Pro Ile Pro Val Leu Leu Val  
 210 215 220  
 Ser Leu Leu Lys Arg Lys Met Ala Pro Gly Cys Trp Phe Leu Ile Ser  
 225 230 235 240  
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 Asp Cys Cys Thr Thr Leu Gln Leu Ser Asn Gly Lys Arg Glu Ile Tyr  
 260 265 270  
 Phe Asn Ser Phe Phe Lys Asp Arg Gln Arg Ala Ser Ala Ala Leu Gln  
 275 280 285  
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 485 490 495  
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 Ala Ser Gln Met Lys Ser Leu Val Tyr Trp Arg Glu Ile Cys Ser Leu  
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 Phe Tyr Thr Met Glu Ser Leu Arg Glu Leu His Ile Phe Asp Asn Asp  
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 Ser Cys Lys Leu Arg Thr Leu Lys Leu Ser Tyr Val Ser Thr Ala Ser  
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 Gly Phe Glu Asp Leu Leu Lys Ala Leu Ala Arg Asn Arg Ser Leu Thr  
 645 650 655

Tyr Leu Ser Ile Asn Cys Thr Ser Ile Ser Leu Asn Met Phe Ser Leu  
 660 665 670  
 Leu His Asp Ile Leu His Glu Pro Thr Cys Gln Ile Ser His Leu Ser  
 675 680 685  
 Leu Met Lys Cys Asp Leu Arg Ala Ser Glu Cys Glu Glu Ile Ala Ser  
 690 695 700  
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 Pro Leu Arg Ser Asp Gly Met Asn Ile Leu Cys Asp Ala Leu Leu His  
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 Pro Asn Cys Thr Leu Ile Ser Leu Val Leu Ser Gly Cys Phe Phe Ser  
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 755 760 765  
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 Ile Gly Leu Glu Glu Cys Met Leu Thr Ser Ala Cys Cys Arg Ser Leu  
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 Ala Ser Val Leu Thr Thr Asn Lys Thr Leu Glu Arg Leu Asn Leu Leu  
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 Gln Asn His Leu Gly Asn Asp Gly Val Ala Lys Leu Leu Glu Ser Leu  
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&lt;211&gt; 2625

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His Phe Pro Arg Ile Pro Trp Ala Asn Leu Arg Ala Ala Asp Pro Leu
35 40 45

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Lys Val Val Leu Gly Ile Phe Gln Thr Met Asn Leu Thr Ser Leu Cys
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Glu Lys Val Arg Ala Glu Met Lys Glu Asn Val Gln Thr Gln Glu Leu
85 90 95

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145 150 155 160	
aaa tac aga gag aac atg aag gct gaa cta ctg gag aca tgg gac aac Lys Tyr Arg Glu Asn Met Lys Ala Glu Leu Leu Glu Thr Trp Asp Asn	528
165 170 175	
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290 295 300	
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